NEW CLAIMS

22. An optical communication system, comprising: first and second optical paths for guiding information-bearing optical radiation partitioned into wavebands; interfacing means for selectively communicating radiation components corresponding to one or more of the wavebands from the first path to the second path, the interfacing means comprising waveband selective diverting means and waveband selective coupling means, the diverting means being included in the first path and operable to divert radiation components corresponding to one or more of the wavebands from the first path to provide diverted radiation, and the coupling means being operable to couple one or more radiation components present in the diverted radiation to the second path; and the second path including waveband selective attenuating means for attenuating radiation of wavebands propagating along the second path, the coupling means being operable to add radiation originating from the first path to radiation output from the attenuating means, and the attenuating means being operable to attenuate radiation of wavebands propagating along the second path coincident in wavelength with radiation added by the coupling means.

23. The system according to claim 22, in which the wavelength diverting means comprises waveband selective filtering means for separating at least part of the information-bearing radiation propagating along the first path into spatially separated rays, each ray corresponding to radiation of an associated waveband; and liquid crystal attenuating means associated with each ray for selectively directing radiation corresponding to the waveband of the ray, the directed radiation contributing to the diverted radiation provided to the coupling means.

24. The system according to claim 22, in which the coupling means comprises waveband selective filtering means for separating at least part of the diverted radiation into spatially

separated rays, each ray corresponding to radiation of an associated waveband; and liquid crystal attenuating means associated with each ray for selectively transmitting or diverting radiation corresponding to the waveband of the ray, thereby selectively providing radiation for output to the second path.

25. The system according to claim 22, in which the attenuating means comprises waveband selective filtering means for separating the radiation propagating along the second path into spatially separated rays, each ray corresponding to radiation of an associated waveband; and liquid crystal attenuating means associated with each ray for selectively transmitting or diverting radiation corresponding to the waveband of the ray, thereby selectively providing radiation for adding to that from the coupling means for further propagation along the second path.

26. The system according to claim 22, in which the diverting means, the attenuating means and the coupling means operate on the information-bearing radiation in the optical domain to couple at least a part of the radiation from the first path to the second path without needing to convert any part of the radiation into a corresponding electrical signal and back to corresponding optical radiation.

27. The system according to claim 22, in which the waveband selective coupling means comprises waveband switching means for transferring information conveyed on a first set of the wavebands of the diverted radiation to a second set of the wavebands in the diverted radiation output to the second path.

28. The system according to claim 27, in which the waveband switching means comprises waveband selecting means for isolating radiation of a selected waveband in the diverted radiation, detecting means for converting the isolated radiation into a corresponding electrical signal,

and an optical radiation source modulatable by the signal and operable to generate radiation bearing the signal and at a waveband mutually different to the selected waveband, the generated radiation for output to the second path.

29. The system according to claim 27, in which the waveband switching means comprises waveband selecting means for isolating radiation of a selected waveband in the diverted radiation, and an optical radiation source biased substantially at its lasing threshold, the source being operable to be stimulated by the isolated radiation such that stimulated radiation generated by the source is modulated by information carried by the isolated radiation, the stimulated radiation being at a waveband mutually different to the selected waveband, the stimulated radiation for output to the second path.

30. The system according to claim 22, in which the coupling means incorporates regenerating means for regenerating the diverted radiation propagating therethrough.

31. The system according to claim 22, in which the first and second paths are operable to support bi-directional radiation propagation therealong, and the interfacing means is operable to couple radiation of one or more of the wavebands propagating in either direction along the first path to the second path for propagation in either direction therealong.

32. The system according to claim 22, wherein the paths include one or more of linear paths and ring paths.

33. The system according to claim 22, wherein at least one of the paths is operable to support bi-directional radiation propagation therealong, the at least one path including redirecting means for coupling radiation of one or more wavebands from a first direction of radiation

propagation to a second direction of radiation propagation along the at least one path, the second direction being mutually oppositely directed to the first direction.

34. An interface for an optical communication system, comprising: first and second optical paths for guiding information-bearing optical radiation partitioned into wavebands, the interface being operable to selectively communicate radiation corresponding to one or more of the wavebands from the first path to the second path, waveband selective diverting means and waveband selective coupling means, the diverting means being included in the first path and operable to divert radiation corresponding to the one or more of the wavebands from the first path to provide diverted radiation, the coupling means being operable to couple radiation of one or more of the wavebands present in the diverted radiation to the second path, the second path including waveband selective attenuating means for attenuating radiation of wavebands propagating along the second path, the coupling means being operable to add radiation originating from the first path to radiation output from the attenuating means, and the attenuating means being operable to attenuate radiation of wavebands propagating along the second path coincident in wavelength with radiation added by the coupling means.

35. The interface according to claim 34, in which the diverting means comprises waveband selective filtering means for separating at least part of the information-bearing radiation into spatially separated rays, each ray corresponding to radiation of an associated waveband; and liquid crystal attenuating means associated with each ray for selectively directing radiation corresponding to the waveband of the ray, the directed radiation contributing to the diverted radiation for the coupling means.

36. The interface according to claim 34, in which the coupling means comprises waveband selective filtering means for separating at least part of the diverted radiation into spatially separated rays, each ray corresponding to radiation of an associated waveband; and liquid crystal attenuating means associated with each ray for selectively transmitting or diverting radiation corresponding to the waveband of the ray, thereby selectively providing radiation for output to the second path.

37. The interface according to claim 34, in which the diverting means and the coupling means operate on the information-bearing radiation in the optical domain to couple at least a part of the radiation from the first path to the second path without needing to convert any part of the radiation into a corresponding electrical signal and back to corresponding radiation.

38. The interface according to claim 34, in which the waveband selective coupling means includes waveband switching means for transferring information conveyed on a first set of the wavebands of the diverted radiation to a second set of the wavebands in the diverted radiation output to the second path.

39. The interface according to claim 38, in which the waveband switching means comprises waveband selecting means for isolating radiation of a selected waveband in the diverted radiation, and an optical radiation source biased substantially at its lasing threshold, the source being operable to be stimulated by the isolated radiation such that stimulated radiation generated by the source is modulated by information carried by the isolated radiation, the stimulated radiation being at a waveband mutually different to the selected waveband, the stimulated radiation for output to the second path.

40. The interface according to claim 38, in which the waveband switching means comprises waveband selecting means for isolating radiation of a selected waveband in the diverted radiation, detecting means for converting the isolated radiation into a corresponding electrical signal, and an optical radiation source modulatable by the signal and operable to generate radiation bearing the signal and at a waveband mutually different to the selected waveband, the generated radiation for output to the second path.

41. The interface according to claim 34, in which the coupling means incorporates regenerating means for regenerating the diverted radiation propagating therethrough.

42. The interface according to claim 34, in which the first and second paths are operable to support bi-directional radiation propagation therealong, and the interface is operable to couple radiation of one or more of the wavebands propagating in either direction along the first path to the second path for propagation in either direction therealong.